WEST Search History

DATE: Wednesday, November 20, 2002

Set Name side by side	Query	Hit Count	Set Name result set
DB=USPT; PLUR=YES; OP=ADJ			
L11	l10 and expansin	0	L11
L10	dna probe comprising.clm.	36	L10
L9	dna probe and expansin	4	L9
L8	L6 and probe	3	L8
L7	L6 and dna probe	0	L7
L6	plant expansion	67	L6
L5	plant expansion protein?	1	L5
L4	expansion and DNA	4601	L4
L3	plant expansion proteins and DNA	1	L3
L2	5959082	2	L2
L1	6255466	1	L1

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L2: Entry 1 of 2 File: USPT Dec 4, 2001

US-PAT-NO: 6326470
DOCUMENT-IDENTIFIER: US 6326470 B1

TITLE: Enhancement of accessibility of cellulose by expansins

DATE-ISSUED: December 4, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Cosgrove; Daniel J.	Pennsylvania Furnace	PA		

US-CL-CURRENT: 530/370; 435/183, 435/195, 435/209, 530/372, 530/375, 530/376, 530/377, 530/378, 530/379

CLAIMS:

What is claimed is:

1. A composition for enhancement of enzymatic degradation of cellulose, comprising an expansin and an enzyme having the property of degrading cellulose.

2. The composition of claim 1 wherein the enzyme is a hydrolytic enzyme.

3. The composition of claim 2 wherein the enzyme is a cellulase.

4. The composition of claim 3 wherein the cellulase is Trichoderma cellulase.

5. A method for enhancing enzymatic degradation of cellulose comprising incubating a sample containing cellulose with an expansin and an enzyme having the property of degrading cellulose.

6. The method of claim 5 wherein the enzyme is a hydrolytic enzyme.

7. The method of claim 6 wherein the enzyme is a cellulase.

8. The method of claim 7 wherein the cellulase is Trichoderma cellulase.

9. The method of claim 8 wherein the expansin is present in an amount of at least about 0.0001 to about 0.005 times the amount of cellulose present.

10. The method of claim 8 wherein the expansin is present in an amount of at least about 0.001 times the amount of cellulose present.

11. The method of claim 8 wherein the expansin is present in an amount of at least about 0.01 to 0.5 times the amount of cellulase present.

12. The method of claim 11 wherein the expansin is present in an amount of at least about 0.1 times the amount of cellulase present.

13. The method of claim 5 wherein the sample is selected from the group

consisting of a textile, paper and rope.

14. A method for enhancing the accessibility of cellulose to chemical or biological modification, comprising incubating a sample containing cellulose with an expansin and a cellulase.

15. A method for enhancing enzymatic degradation of cellulose comprising incubating a sample containing cellulose with an expansin and a cellulase, said expansin being present in an amount of at least about 0.01 to 0.5 times the amount of cellulase present.

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End of Result Set

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L2: Entry 2 of 2 File: USPT Sep 28, 1999

US-PAT-NO: 5959082
DOCUMENT-IDENTIFIER: US 5959082 A

TITLE: Proteins catalyzing the extension of plant cell walls

DATE-ISSUED: September 28, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Cosgrove; Daniel J.	State College	PA		
McQueen-Mason; Simon	York			GB
Guiltinan; Mark	State College	PA		
Shcherban; Tatyana	State College	PA		
Shi; Jun	State College	PA		

US-CL-CURRENT: 530/370; 530/324, 530/372, 530/375, 530/376, 530/377, 530/378, 530/379, 530/412, 530/417, 530/418, 530/419

CLAIMS:

What is claimed is:

1. A catalytic composition comprising an acidic medium and a salt-soluble polypetide having a molecular weight of about 29-30 kD as measured by SDS-PAGE and an amino acid sequence of any of SEQ. ID. NO: 1 through SEQ. ID. NO:6, wherein the composition induces expansion of inert plant cell wall material.

2. A composition according to claim 1, wherein the acidic medium has a pH of about 5.5 to 3.5.

3. A composition according to claim 1, further comprising a sulfhydryl reducing agent.

4. A composition according to claim 1, wherein the acidic medium comprises a member selected from the group consisting of sodium acetate and urea.

5. A composition according to claim 1, wherein the expansion is irreversible.

6. A composition according to claim 1, wherein the polypeptide is produced synthetically.

7. A composition according to claim 1, wherein the polypeptide is of plant origin.

8. A composition according to claim 7, wherein the polypeptide is derived from a plant family selected from the group consisting of cucumber, oat, broccoli, celery, tomato, cotton, flax, cabbage and corn.

9. A composition according to claim 1, wherein the polypeptide is derived from cell wall material of a plant growing region.

10. A composition according to claim 9, wherein the plant is from the group consisting of cucumber, oat, broccoli, celery, tomato, cotton, flax, cabbage and corn.

11. A polypeptide comprising an amino acid sequence of any of SEQ ID. NO:1 through SEQ. ID. NO:6 and which induces an extension of plant cell wall material.

12. A polypeptide according to claim 11 having a molecular weight of from 25-30 kD as determined by SDS-PAGE.

13. A polypeptide according to claim 11 that is derived from cell wall material of a plant growing region.

14. A polypeptide according to claim 11 which induces the extension of plant call wall material in the presence of an acid.

15. A polypeptide according to claim 14 wherein the acid has a pH of about 5.5 to 3.5.

16. A polypeptide having at least 60% sequence similarity to an amino acid sequence selected from the group consisting of SEQ. ID. NO: 1 through SEQ. ID. NO: 6 and which induces an extension of plant cell wall material.

17. A polypeptide according to claim 16 having a molecular weight of from 25-30 kD as determined by SDS-PAGE.

18. A polypeptide according to claim 16 having at least 70% sequence similarity to the amino acid sequence of SEQ ID. NO: 1.

19. A polypeptide of claim 16, wherein the amino acid sequence is SEQ. ID. NO: 1.

20. A polypeptide according to claim 19 having a molecular weight of from 25-30 kD as determined by SDS-PAGE.

21. A method of weakening [the] mechanical strength of cellulose comprising contacting a quantity of cellulose with a composition having at least one polypeptide comprising an amino acid sequence of any of SEQ. ID. NO: 1 through SEQ. ID. NO: 6.

22. A method according to claim 21, wherein the composition further comprises at least one of a sulfhydryl reducing agent and an acid.

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Search Results - Record(s) 1 through 2 of 2 returned.

☐ 1. Document ID: US 6326470 B1

L2: Entry 1 of 2 File: USPT Dec 4, 2001

US-PAT-NO: 6326470
DOCUMENT-IDENTIFIER: US 6326470 B1

TITLE: Enhancement of accessibility of cellulose by expansins

DATE-ISSUED: December 4, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Cosgrove; Daniel J.	Pennsylvania Furnace	PA		

US-CL-CURRENT: 530/370; 435/183, 435/195, 435/209, 530/372, 530/375, 530/376, 530/377, 530/378, 530/379

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw. Desc | Image

☐ 2. Document ID: US 5959082 A

L2: Entry 2 of 2 File: USPT Sep 28, 1999

US-PAT-NO: 5959082
DOCUMENT-IDENTIFIER: US 5959082 A

TITLE: Proteins catalyzing the extension of plant cell walls

DATE-ISSUED: September 28, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Cosgrove; Daniel J.	State College	PA		
McQueen-Mason; Simon	York			GB
Guiltinan; Mark	State College	PA		
Shcherban; Tatyana	State College	PA		
Shi; Jun	State College	PA		

US-CL-CURRENT: 530/370; 530/324, 530/372, 530/375, 530/376, 530/377, 530/378, 530/379, 530/412, 530/417, 530/418, 530/419

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw. Desc | Image

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Terms	Documents
5959082	2

Display Format: CIT Change Format

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L1: Entry 1 of 1 File: USPT Jul 3, 2001

US-PAT-NO: 6255466
DOCUMENT-IDENTIFIER: US 6255466 B1

TITLE: Purified plant expansion proteins and DNA encoding same

DATE-ISSUED: July 3, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Cosgrove; Daniel J.	State College	PA		
McQueen-Mason; Simon	York			GB
Guiltinan; Mark	State College	PA		
Shcherban; Tatyana	State College	PA		
Shi; Jun	State College	PA		

US-CL-CURRENT: 536/23.1; 435/252.3, 435/320.1, 435/69.1, 530/350, 536/23.2, 536/23.5, 536/23.6

CLAIMS:

What is claimed is:

1. An isolated polynucleotide comprising a nucleotide sequence of SEQ ID NO: 1, and which encodes a protein having expansin activity.

2. An isolated polynucleotide comprising a DNA sequence encoding a polypeptide selected from the group consisting of SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 5, SEQ ID NO: 6 and SEQ ID NO: 7.

3. An isolated polynucleotide having 90% sequence similarity to SEQ ID NO: 1, and which encodes a protein having expansin activity.

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Search Results - Record(s) 1 through 4 of 4 returned.

☐ 1. Document ID: US 6458928 B1

L9: Entry 1 of 4 File: USPT Oct 1, 2002

US-PAT-NO: 6458928
DOCUMENT-IDENTIFIER: US 6458928 B1

TITLE: Microbial swollenin protein, DNA sequences encoding such swollenins and method of producing such swollenins

DATE-ISSUED: October 1, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Swanson; Barbara A.	San Francisco	CA		
Ward; Michael	San Francisco	CA		
Penttila ; Merja	Helsinki			FI
Pere; Jaakko	Vantaa			FI
Saloheimo; Markku	Helsinki			FI

US-CL-CURRENT: 530/350; 435/262, 530/300

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

☐ 2. Document ID: US 6323023 B1

L9: Entry 2 of 4 File: USPT Nov 27, 2001

US-PAT-NO: 6323023
DOCUMENT-IDENTIFIER: US 6323023 B1

TITLE: Vectors containing nucleic acids coding for Arabidopsis thaliana endo-1,4-.beta.-glucanase secretion signal peptide

DATE-ISSUED: November 27, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Shoseyov; Oded	Karme Yosef			IL
Shani; Ziv	Rehovoth			IL

US-CL-CURRENT: 435/320.1; 435/69.8, 800/287, 800/288, 800/290

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

☐ 3. Document ID: US 6184440 B1

L9: Entry 3 of 4 File: USPT Feb 6, 2001

US-PAT-NO: 6184440
DOCUMENT-IDENTIFIER: US 6184440 B1

TITLE: Transgenic plants of altered morphology

DATE-ISSUED: February 6, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Shoseyov; Oded	Karme Yosef			IL
Shani; Ziv	Rehovoth			IL
Shpigel; Etai	Kibbutz Megido			IL

US-CL-CURRENT: 800/290; 435/419, 435/468, 435/69.7, 435/69.8, 800/284, 800/287, 800/288

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw Desc | Image

☐ 4. Document ID: US 6005092 A

L9: Entry 4 of 4 File: USPT Dec 21, 1999

US-PAT-NO: 6005092
DOCUMENT-IDENTIFIER: US 6005092 A

TITLE: Arabidopsis thaliana endo-1,4-.beta.-glucanase gene and promoter

DATE-ISSUED: December 21, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Shoseyov; Oded	Karme Yosef			IL
Shani; Ziv	Rehovoth			IL

US-CL-CURRENT: 536/23.6; 435/209, 435/320.1, 435/419, 435/468, 536/24.1, 800/278, 800/290

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw Desc | Image

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Terms	Documents
dna probe and expansin	4

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L9: Entry 1 of 4 File: USPT Oct 1, 2002

DOCUMENT-IDENTIFIER: US 6458928 B1
TITLE: Microbial swollenin protein, DNA sequences encoding such swollenins and method of producing such swollenins

Abstract Text (1):
A novel microbial protein is described which appears to have significant homology to plant expansin proteins and has the ability to weaken filter paper and swell cellulose. A DNA is described which encodes the novel protein.

Brief Summary Text (3):
Shcherban et al., Proc. Nat. Acad. Sci., USA, Vol. 92, pp. 9245-9249 (1995) isolated cDNA's encoding these two cucumber proteins and compared them to anonymous expressed sequence tags from various sources. Rice and Arabidopsis expansin cDNA were identified from these collections and showed at least four different expansin cDNA's in rice and six different expansin cDNA's in Arabidopsis. The authors concluded that expansin are highly conserved in size and sequence (60-87% amino acid identity and 75-95% similarity between any pairwise comparison) and that the multigene family formed before the evolutionary divergence between monocotyledons and dicotyledons. Shcherban et al. states that the high conservation of this mutligene family indicates that the mechanism by which expansin promotes cell wall extension tolerates little variation in protein structure.

Brief Summary Text (5):
Cosgrove et al., J. Exp. Botany, Vol. 45, Special Issue, pp. 1711-1719 (1994) suggested that cooperative interactions between the expansin proteins and pectinases and cellulases may occur, wherein the enzymes modify the matrix so that other wall extension mechanisms may be more effective. Fry, Current Biology, Vol. 4, No. 9 (1994) suggest that, in loosening cell walls, expansin seems unlikely to break cellulose-cellulose bonds as microfibrils remain intact during growth. Thus, the authors discount the observed breakage of hydrogen bonds in filter paper as a side issue and suggest that expansin may lengthen inter-microfibrillar tethers by causing hemicellulose chains to detach from cellulose microfibrils to allow extension.

Brief Summary Text (6):
Despite the pioneering work previously done in the area of cell wall extension and its causes, work related to the usefulness and operability of expansins is still in its infancy. Moreover, the sources of expansin up to now have been exclusively from plant origins, for which expression systems may not be optimal for large scale production. Accordingly, it would be valuable to have a ready source of expansin-like material which is capable of being produce in large quantities from organisms which are established high output producers of biological materials, such as fungi, bacteria or other well characterized microorganisms.

Brief Summary Text (14):
In another embodiment of the invention, a DNA is provided which encodes a microbial, e.g., bacterial or fungal, swollenin, and the DNA hybridizes with a DNA probe encoding a peptide having an amino acid sequence comprising SEQ. ID NO:14, SEQ. ID NO:15, SEQ. ID NO:16, SEQ. ID NO:17 or SEQ. ID NO:18. Vectors comprising such DNA, host cells having been transformed with such vectors and fermentation broths produced by such transformed host cells are also within the scope of the present invention.

Brief Summary Text (16):
Since fungi and bacteria do not generally have a cellulosic cell wall and in any event are not known to increase in size by the same mechanism as higher plants, Applicants discovery that these microorganisms produce proteins having expansin-like properties is

not suggested by previous work related to plant expansins. Thus, the finding that the cellulolytic fungus Trichoderma spp. produces an expansin-like protein is unexpected. However, it is apparent that the microbial class of proteins differs from those heretofore discovered in plants. For example, the presence of a region on the microbial swollenin protein described herein corresponding to the cellulose binding domain of fungal cellulolytic enzymes suggests that this protein is secreted to act in concert with the naturally secreted cellulases and hemicellulases in order to facilitate hydrolysis of cellulosic biomass in the environment. Consistent with this suggestion, the Trichoderma reesei swollenin gene was found to be expressed when the fungus was grown on cellulose as a sole carbon source, but not when the carbon source for growth was glucose. This pattern of regulation of gene expression is similar to that observed for many of the Trichoderma cellulose and hemicellulose genes. These unexpected findings lead to the conclusion that cellulose or hemicellulose degrading micro-organisms, including bacteria, yeast and fungi, would also produce- such swollenin proteins.

Drawing Description Text (3):
FIG. 2 illustrates a comparison of the consensus amino acid sequence for plant expansin proteins (SEQ ID NO:3) and the sequence of the swollenin (SEQ ID NO:4) described herein showing the regions of amino acid homology.

Drawing Description Text (5):
FIGS. 4A-4B illustrates a comparison of nine known plant expansin amino acid sequences (SEQ ID NOS:5-13) showing the extensive homology present in plant expansins.

Detailed Description Text (3):
"Swollenin" means a protein or polypeptide or domain of a protein or polypeptide of microbial, i.e., fungal or bacterial, origin which has the ability to facilitate weakening of filter paper and the swelling of cotton fibers without having cellulolytic activity, i.e., catalytic activity involving the breakage of individual cellulose strands into smaller monomer (glucose) or oligomers (polysaccharides). While it is useful to define swollenins loosely in terms of the expansin proteins described in McQueen-Mason et al., Plant Cell, Vol. 4, pp. 1425-1433 (1992), it is also apparent that microbial swollenins have distinct properties, for example, microbial swollenins are much larger proteins than plant expansins and have a low level of sequence identity with plant expansins. Moreover, certain microbial swollenin proteins exist in conjunction with a cellulose binding domain and may further exist in conjunction with a catalytic cellulase domain. For example, the swollenin protein derived from Trichoderma reesei shown herein possesses a cellulose binding domain.

Detailed Description Text (7):
A DNA probe taken from the sequence in FIGS. 1A-1B should be isolated by electrophoresis in an agarose gel, the fragment excised from the gel and recovered from the excised agarose. This purified fragment of DNA is then labeled (using, for example, the Megaprime labeling system according to the instructions of the manufacturer to incorporate p.sup.32 in the DNA (Amersham International plc, Buckinghamshire, England)). The labeled probe is denatured by heating to 95.degree. C. for 5 minutes and immediately added to the prehybridization solution above containing the membrane. The hybridization reaction should proceed for an appropriate time and under appropriate conditions, for example, for 18 hours at 37.degree. C. with gentle shaking. The membrane is rinsed (for example, in 2.times.SSC/0.3% SDS) and then washed with an appropriate wash solution and with gentle agitation. The stringency desired will be a reflection of the conditions under which the membrane (filter) is washed. .sup.1 Eesto Corp. v. Shokersu Kogyo Kabushiki Co., No. 95-1066, 2000 WL 1753646 (Fed Cir. Nov. 29, 2000).

Detailed Description Text (52):
Regions of similarity are observed between the predicted amino acid sequence (SEQ ID NO: 2) of the Trichoderma swollenin of FIGS. 1A-1B and known sequences of higher plant expansins. FIG. 2 shows an alignment between part of the predicted Trichoderme protein and a consensus sequence (SEQ ID NO: 3) derived from nine plant expansins by Shcherban et al., supra. These sequences were aligned using the Jotun Hein algorithm within the Lasergene software package (DNASTAR Inc) and a 36% similarity was calculated between the two amino acid sequences. Of the 322 amino acids of Trichoderma swolenin sequence used in this alignment 70 or 21.7% are identical to the higher plant consensus sequence.

Detailed Description Text (53):
Regions of similarity can also be observed between the Trichoderma reesei

(longibrachiatum) swollenin and human titin protein that is rich in fibronectin type repeats. The homology was detected in a similarity search to the protein sequence databanks carried out with the program BLAST (Altschul et al., 1990, J. Mol. Biol. 215:403-410) and the alignments shown as examples have been created by the program. The regions of titin homologous to the T reesei swollenin are parts of the fibronectin type repeats. Fibronectin repeats have been found in some bacterial carbohydrate-modifying enzymes (Little et al., 1994, J. Mol. Evol. 39:631-643) but not from any fungal protein. A BLAST search reveals no similarity between the plant expansins and fibronectin repeat containing proteins.

Detailed Description Text (73):
The general technique in Examples 2 and 3 may be adapted in conjunction with known techniques to obtain clones comprising swollenin or swollenin-type genes from other fungi and bacteria. Plasmid pSLexpPCR or the isolated 1.3 kb DNA insert encoding part of the swollenin gene (Example 2), may be labelled as can the core region of the swollenin (Example 3). This DNA probe can then be used to hybridize with genomic DNA or cDNA from other fungi or bacteria. Sequences which have been published for higher plant expansins show a very high level of amino acid identity (see, eg., FIGS. 4A-4B, where underlined segments indicate regions of high homology). A comparison of the deduced amino add sequence of the Ticohoderma swollenin with the known amino acid sequences of higher plant expansins identifies certain conserved regions of amino acids between the swollenins and plant expansins. These conserved regions provide the basis for designing degenerate primers for use in PCR amplification of swollenin-encoding DNA from other microorganisms. Such methods are generally known in the art and considered routine (see e.g., McPherson et al., PCR A Practical Aproach, pp. 171-186 (1991)). Conserved regions corresponding to amino adds 192-200 and 366-371 of SEQ ID NO:2 are pointed to as being particularly useful for this purpose (see also, highlighted segments of FIG. 2 although other conserved regions could be used.

Detailed Description Text (74):
The sequence at amino add residues 192-200 of SEQ ID NO:2, TSGGACGFG (SEQ. ID NO:14), is highly homologous to the corresponding sequence in the consensus plant expansin sequence TMGGACGYG (SEQ. ID NO. 15)(numbered positions 19-27 in FIGS. 4A-4B). Based on this region of homology, it would be possible to synthesize degenerate oligonucleotides comprising all possible DNA sequences which encode part or all of the amino acid sequence T(M/S)GGACG(Y/F)G (see e.g., McPherson et al., supra, page 174).

Detailed Description Text (75):
The sequence at amino acid residues 366 to 371 of SEQ ID:NO.2, YRRVQC (SEQ. ID NO. 16), is highly homologous to the corresponding sequence in the consensus plant expansin sequences YRRVPC (SEQ ID. NO:17) and FRRVPC (SEQ. ID NO: 18) (numbered positions 127-132 in FIGS. 4A-4B). Based on this region of homology, it would also be possible to synthesize degenerate oligonucleotides to include all possible DNA sequences which encode part or all of the amino acid sequence (F/Y)RRV(P/Q)C. The oligonucleotides derived from this amino acid sequence would be used in conjunction with those derived from the previous mentioned amino acid sequence as primers for routine PCR experiments using genomic DNA. Genomic DNA or cDNA could then easily be obtained from any microbe and used as a template in such PCR experiments. In this way it would be possible to done genes encoding swollenins from a variety of microbes.

Other Reference Publication (4):
Fry, Stephen C., "Unzipped by expansins," Current Biology, vol. 4, No. 9, pp. 815-817, 1994.

Other Reference Publication (5):
Keller, Elvira et al., "Expansins in growing tomato leaves," The Plant Journal, pp. 795-802, 1995.

Other Reference Publication (8):
Shcherban, Tatyana Y. et al., Molecular cloning and sequence analysis of expansins--a highly conserved, multigene family of proteins that mediate cell wall extension in plants, Proc. Natl., Acad. Sci. USA, vol. 92, pp. 9245-9249, 1995.

Other Reference Publication (10):
Wang, Ping et al., Production of expansin from light/dark Trichosanthes kirilowii var. Japonicum root cultures, Biotechnology Letters, vol. 16, No. 9, pp. 955-958, 1994.

WEST

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L10: Entry 1 of 36 File: USPT Apr 9, 2002

US-PAT-NO: 6368833
DOCUMENT-IDENTIFIER: US 6368833 B1

TITLE: Esterases, DNA encoding therefor and vectors and host incorporating same

DATE-ISSUED: April 9, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Borneman; William S.	San Carlos	CA		
Bower; Benjamin S.	Pacifica	CA		

US-CL-CURRENT: 435/91.1; 435/197, 435/252.3, 435/320.1, 435/325, 536/23.1, 536/23.2

CLAIMS:

We claim:

1. An isolated DNA encoding the amino acid according to SEQ ID NO:28.

2. An isolated DNA capable of hybridizing under standard-stringency conditions with a DNA comprising at least 400 nucleotides of the DNA sequence according to SEQ ID NO: 29 and wherein said isolated DNA encodes a protein having esterolytic activity which cleaves the ester linkages of phenolic esters.

3. An expression vector comprising the DNA according to claim 1.

4. A host cell transformed with the DNA according to claim 1.

5. A host cell transformed with the expression vector according to claim 3.

6. A DNA which encodes a protein having esterolytic activity which cleaves the ester linkage of phenolic esters having a nucleotide sequence of SEQ ID NO: 29 or a portion of the sequence of SEQ ID NO: 29 wherein said portion comprises at least 400 nucleotides.

7. A method of producing an esterase comprising the steps of: (a) transforming a suitable microbial host cell with an expression vector comprising the DNA according to claims 1 or 2; and (b) cultivating said transformed host cell under conditions suitable for said host cell to produce said esterase.

8. The method according to claim 7 further comprising, (c) separating said produced esterase from said host cells to obtain a purified esterase.

9. A method of isolating a DNA which encodes a protein having esterolytic activity which cleaves the ester linkages of phenolic esters comprising: (a) creating a library comprising fragments from a first DNA derived from a plant, animal, fungus, yeast or bacteria; (b) combining said library of said first DNA with a probe comprising a second DNA under low-stringency to effect hybridization between said fragments in said library of DNA and said probe wherein said probe comprises DNA corresponding to SEQ ID NO: 29 or a portion

thereof comprising at least 100 nucleotides; and (c) separating the hybridized DNA fragments from the non-hybridized fragments.

10. The method according to claim 9, wherein said first DNA is derived from a filamentous fungus.

11. The method according to claim 9, wherein said first DNA is derived from Aspergillus.

12. The method according to claim 9, wherein said conditions suitable for hybridization comprise standard-stringency conditions.

13. The method according to claim 9, wherein said probe comprises DNA corresponding to a portion of SEQ. ID NO:29 comprising at least 400 nucleotides.

14. DNA isolated according to the method of claim 9.

15. DNA isolated according to the method of claim 11.

16. DNA isolated according to the method of claim 12.

17. DNA isolated according to the method of claim 13.

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Search Results - Record(s) 1 through 10 of 36 returned.

☐ 1. Document ID: US 6368833 B1

L10: Entry 1 of 36 File: USPT Apr 9, 2002

US-PAT-NO: 6368833
DOCUMENT-IDENTIFIER: US 6368833 B1

TITLE: Esterases, DNA encoding therefor and vectors and host incorporating same

DATE-ISSUED: April 9, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Borneman; William S.	San Carlos	CA		
Bower; Benjamin S.	Pacifica	CA		

US-CL-CURRENT: 435/91.1; 435/197, 435/252.3, 435/320.1, 435/325, 536/23.1, 536/23.2

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

☐ 2. Document ID: US 6344328 B1

L10: Entry 2 of 36 File: USPT Feb 5, 2002

US-PAT-NO: 6344328
DOCUMENT-IDENTIFIER: US 6344328 B1

TITLE: Method for screening for enzyme activity

DATE-ISSUED: February 5, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Short; Jay M.	Rancho Santa Fe	CA		

US-CL-CURRENT: 435/6; 435/91.2

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

☐ 3. Document ID: US 6203977 B1

L10: Entry 3 of 36 File: USPT Mar 20, 2001

US-PAT-NO: 6203977

DOCUMENT-IDENTIFIER: US 6203977 B1

TITLE: Delineation of individual human chromosomes in metaphase and interphase cells by in situ suppression hybridization

DATE-ISSUED: March 20, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Ward; David C.	Guilford	CT		
Lichter; Peter	Heidelberg			DE
Cremer; Thomas	Heidelberg			DE
Manuelidis; Laura	New Haven	CT		
Ried; Thomas	Heidelberg			DE
Baldini; Antonio	London			GB

US-CL-CURRENT: 435/6; 536/24.3, 536/27.1

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw Desc | Image

☐ 4. Document ID: US 6169174 B1

L10: Entry 4 of 36 File: USPT Jan 2, 2001

US-PAT-NO: 6169174
DOCUMENT-IDENTIFIER: US 6169174 B1

TITLE: Cotton plant gene

DATE-ISSUED: January 2, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Hasegawa; Osamu	Tokyo			JP
Aotsuka; Satoshi	Tokyo			JP
Takenishi; Soichiro	Tokyo			JP
Uchimiya; Hirofumi	Kawasaki			JP

US-CL-CURRENT: 536/23.6; 435/6, 530/350, 530/370

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
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☐ 5. Document ID: US 6132972 A

L10: Entry 5 of 36 File: USPT Oct 17, 2000

US-PAT-NO: 6132972
DOCUMENT-IDENTIFIER: US 6132972 A

TITLE: Method for detecting nucleic acids through a triple-stranded DNA intermediate without denaturing

DATE-ISSUED: October 17, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Shigemori; Yasushi	Kisarazu			JP
Fujiwara; Jun	Kisarazu			JP

US-CL-CURRENT: 435/6; 435/19, 435/23

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

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☐ 6. Document ID: US 6100024 A

L10: Entry 6 of 36 File: USPT Aug 8, 2000

US-PAT-NO: 6100024
DOCUMENT-IDENTIFIER: US 6100024 A

TITLE: Methods and compositions for nucleic acid detection by target extension and probe amplification

DATE-ISSUED: August 8, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Hudson; Geoffrey R.	Madison	WI		
Schumm; James W.	Madison	WI		
Dimond; Randall L.	Madison	WI		

US-CL-CURRENT: 435/6; 435/91.2, 536/23.1, 536/24.1, 536/24.3, 536/24.31, 536/24.32, 536/24.33

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

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☐ 7. Document ID: US 6054299 A

L10: Entry 7 of 36 File: USPT Apr 25, 2000

US-PAT-NO: 6054299
DOCUMENT-IDENTIFIER: US 6054299 A

TITLE: Stem-loop cloning vector and method

DATE-ISSUED: April 25, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Conrad; Charles A.	Houston	TX	77066	

US-CL-CURRENT: 435/91.1; 435/252.3, 435/320.1, 435/91.4

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

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☐ 8. Document ID: US 6054267 A

L10: Entry 8 of 36 File: USPT Apr 25, 2000

US-PAT-NO: 6054267
DOCUMENT-IDENTIFIER: US 6054267 A

TITLE: Method for screening for enzyme activity

DATE-ISSUED: April 25, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Short; Jay M.	Encinias	CA		

US-CL-CURRENT: 435/6; 435/69.1

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
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☐ 9. Document ID: US 5958674 A

L10: Entry 9 of 36 File: USPT Sep 28, 1999

US-PAT-NO: 5958674
DOCUMENT-IDENTIFIER: US 5958674 A

TITLE: Probes for papillomaviruses and an in vitro diagnostic procedure for papilloma infections

DATE-ISSUED: September 28, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Beaudenon; Sylvie	Clamart			FR
Kremsdorf; Dina	Paris			FR
Croissant; Odile	Paris			FR
Orth; Gerard	Sceaux			FR

US-CL-CURRENT: 435/5; 435/252.3, 435/252.33, 435/320.1, 435/363, 435/366, 435/810, 536/23.1, 536/24.3, 536/24.32

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
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☐ 10. Document ID: US 5944971 A

L10: Entry 10 of 36 File: USPT Aug 31, 1999

US-PAT-NO: 5944971
DOCUMENT-IDENTIFIER: US 5944971 A

TITLE: Large scale DNA microsequencing device

DATE-ISSUED: August 31, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Foote; Robert S.	Oak Ridge	TN		

US-CL-CURRENT: 204/456; 204/466, 204/606, 204/616, 435/287.2, 435/6

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

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dna probe comprising.clm.	36

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L10: Entry 4 of 36 File: USPT Jan 2, 2001

US-PAT-NO: 6169174
DOCUMENT-IDENTIFIER: US 6169174 B1

TITLE: Cotton plant gene

DATE-ISSUED: January 2, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Hasegawa; Osamu	Tokyo			JP
Aotsuka; Satoshi	Tokyo			JP
Takenishi; Soichiro	Tokyo			JP
Uchimiya; Hirofumi	Kawasaki			JP

US-CL-CURRENT: 536/23.6; 435/6, 530/350, 530/370

CLAIMS:

What is claimed is:

1. A DNA coding for a protein comprising the amino acid sequence shown in SEQ ID No:2 or an amino acid sequence at least 80% identical to the amino acid sequence shown in SEQ ID No:2, wherein said encoded amino acid sequence is the sequence of a protein naturally occurring in Gossypium hirsutum.

2. The DNA according to claim 1, comprising the nucleic acid sequence shown in SEQ ID No:1 from residue 134 to residue 757 or a nucleic acid sequence at least 80% identical to the nucleic acid sequence shown in SEQ ID No:1 from residue 134 to residue 757, wherein said nucleic acid sequence encodes a protein naturally occurring in Gossypium hirsutum.

3. A DNA as a probe for hybridization, used to isolate transcription regulatory region regulating an expression of a gene expressed during cotton fiber formation, the DNA probe comprising all of the sequence of the DNA as defined in claim 2.

4. A method for isolating a transcription regulatory region which regulates an expression of a gene, the gene being expressed during cotton fiber formation, comprising the step of isolating the gene from a DNA library by hybridization using the DNA probe as defined in claim 3.

5. A DNA probe for hybridization, used to isolate a gene, wherein the gene encodes polyamino acids having zinc finger motifs and is expressed in cotton plant, the DNA probe comprising all of the sequence of the DNA as defined in claim 2.

6. A method for isolating a gene which encodes polyamino acids having zinc finger motifs and is expressed in cotton plant, comprising the step of isolating the gene from a DNA library by hybridization using the DNA probe as defined in claim 5.

7. A DNA probe for hybridization, used to isolate a transcription regulatory region regulating an expression of a gene expressed during cotton fiber formation, the DNA probe comprising all of the sequence of the DNA as defined in claim 1.

8. A method for isolating a transcription regulatory region which regulates an expression of a gene, the gene being expressed during cotton fiber formation, comprising the step of isolating the gene from a DNA library by hybridization using the DNA probe as defined in claim 7.

9. A DNA probe for hybridization, used to isolate a gene, wherein the gene encodes polyamino acids having zinc finger motifs and is expressed in cotton plant, the DNA probe comprising all of the sequence of the DNA as defined in claim 1.

10. A method for isolating a gene which encodes polyamino acids having zinc finger motifs and is expressed in cotton plant, comprising the step of isolation the gene from a DNA library by hybridization using the DNA probe as defined in claim 9.